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| EXAMINER | | | | |
| MILLER, MICHAEL G | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/581,739

Applicant(s)

SCHNEWEIS, STEFAN

Examiner

MICHAEL G. MILLER

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-22 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 15-22 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SI/200)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

1. Examiner notes the amendment filed 30 JUN 2009. As a result of the amendment:

- a. Claims 1-14 are canceled.
- b. Claim 15 is amended.
- c. Claims 15-22 are pending.

Response to Arguments

2. Applicant's arguments, see below, filed 30 JUN 2009, with respect to the rejection(s) of claim(s) 15-22 under 35 U.S.C. 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Christner et al, Sekhar et al, Bernard et al and Carroll et al.

3. Applicant's first argument is that the prior art of record in the case does not teach a substrate with opposite lateral supporting surfaces and pore channels connecting said surfaces. Examiner agrees, as the surfaces which are meant to be supporting material in the prior art of record are non-lateral and non-porous. However, after further search and consideration, Examiner relies on Christner et al, which teaches a lateral porous carbon electrode which is capable of being used as a support structure for gas treatment (which is commensurate in scope with the claims as presented). The structure is thin and uniform with a pair of large, planar opposed surfaces and a very high porosity. The porosity obtained is high enough where all surfaces of the sheet will

be interconnected with pore channels, as Christner specifically touts high porosity and flowthrough. Sekhar, Bernard and Carroll are brought in to address Claim 20, requiring a graded C/SiC coating, and will be discussed in more detail below.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 15-19 and 21-22 rejected under 35 U.S.C. 102(b) as being anticipated by Christner et al (U.S. Patent 4,115,528, hereinafter '528).

6. Claim 15 – '528 teaches a method for forming a gas permeable substrate, the substrate comprising carbon and having pore channels for carrying gas interspersed through the substrate (Abstract, Column 2 Lines 26-31), the substrate having a first lateral surface and an opposite lateral surface (Column 4 Lines 31-35), comprising the steps of:

- d. Producing a framework made of carbon fibers (Column 4 Lines 31-35);
and
- e. Stabilizing the framework with at least one pyrocarbon and/or silicon carbide coating that forms a matrix, such that the stabilized framework has a porosity level that forms the pore channels (Column 4 Lines 41-46),
- f. Said pore channels being disposed between the first lateral surface and the opposite lateral surface, and opening onto the first lateral surface and the

opposite lateral surface, to enable gas flow from the opposite lateral surface to the first lateral surface for treatment of the object by the gas which has passed through the pore channels (inherent: given the ratio of thickness to surface area and the porosity obtained in Example 1, the pore channels will connect the opposing lateral surfaces).

7. Claim 16 – The fibers are stabilized by fluid impregnation (Column 4 Lines 28-32).
8. Claim 17 – The framework comprises stabilized non-woven materials (Column 4 Lines 31-35).
9. Claim 18 – The framework is stabilized solely with carbon (Column 4 Lines 43-46, carbonization treatment).
10. Claim 19 – rejected as Claim 18.
11. Claim 21 – The substrate has 85% porosity (Column 4 Lines 51-55).
12. Claim 22 – The treated fibers form a thin, uniform layer (Column 4 Lines 31-34).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over '528 in view of Sekhar et al (U.S. Patent 6,455,107, hereinafter '107), Bernard et al (U.S. Patent 5,352,484, hereinafter '484) and Carroll et al (U.S. patent 5,397,595, hereinafter '595).

16. Claim 20 – '528 is silent as to forming graded compositions of carbon / silicon carbide coating material. '107 teaches that it is known to use carbonaceous materials as anodes in electrical systems, but that they have a poor resistance to oxidation which limits their use in this area (Column 1 Lines 20-37). '484 teaches a method of liquid infiltration of porous carbon substrates wherein submicron carbon powder is forced into a substrate by fluid infiltration (Column 3 Line 55 – Column 4 Line 17). It further teaches adding oxidation inhibitors to the carbon powder (Column 5 Lines 7-17) which include silicon carbide and teaches that the resin may also be introduced with the carbon powder (Column 5 Lines 18-25). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the methods of '528 and '484, in light of the teaching of '107, as both methods want to provide carbonaceous coatings on carbon fiber preforms, '107 teaches that carbonaceous materials used as anodes suffer from low resistance to oxidation, and '484 teaches that the addition of silicon carbide adds an advantageous oxidation resistance property. '528/'107/'484 are silent as to forming a graded carbon/silicon

carbide composition. '595 teaches that silicon carbide coatings applied to a carbon substrate only provide limited oxidation resistance property owing to cracking and peeling (Column 2 Lines 39-44) and teaches a method for forming a graded carbon/silicon carbide layer on a carbon substrate (Column 5 Lines 26-46) with an eye towards improving the bond between the coating and the fiber surface (Column 2 Lines 64-67) which will inherently improve the resistance to peeling and cracking and therefore will improve the oxidation resistance of the substrate. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the methods of '528/'107/'484 and '595, as both methods want to form a coating containing carbon and silicon carbide on the surface of a porous carbon substrate using fluid impregnation and '595 teaches that using a variable composition impregnation medium allows for a graduated coating to be formed which allows for better adhesion of the coating to the substrate.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL G. MILLER whose telephone number is (571)270-1861. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael G. Miller/

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Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792